

# **Workshop on Single Particle Reconstructions And Visualization**

**Scientific Animation**

# **Tutorial**

**Matthew Dougherty**

*National Center for Macromolecular Imaging*

**December 14, 2002**

matthewd@bcm.tmc.edu

# Scientific Animation

- Preliminary
- Iris Explorer basics
- SAIL basics

# Preliminary

## Survey

1. How many are familiar with LINUX?
2. How many are familiar with Iris Explorer?
3. How many are using other viz packages?
4. How many program in C, C++, or Fortran?
5. How many have datasets for Sunday?

# Preliminary Disclaimer

- Developed for SGI
- Lab is running with Linux Red Hat 8.0
- Iris Explorer 5.0 tested against 6.1 => 7.3
- Alpha version of explorer on RH 8
- Alpha version of SAIL on Linux
- MPEG compression does not work under Linux
  
- For our lawyers, who have microscopes:

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# Preliminary

## Getting started

### 1. Login

- Account = baylor
- Password = jkl06\$

### 2. Type the following:

*tssh*

*mount /data*

*ls -l /data/viz/update*

*source /data/viz/update*

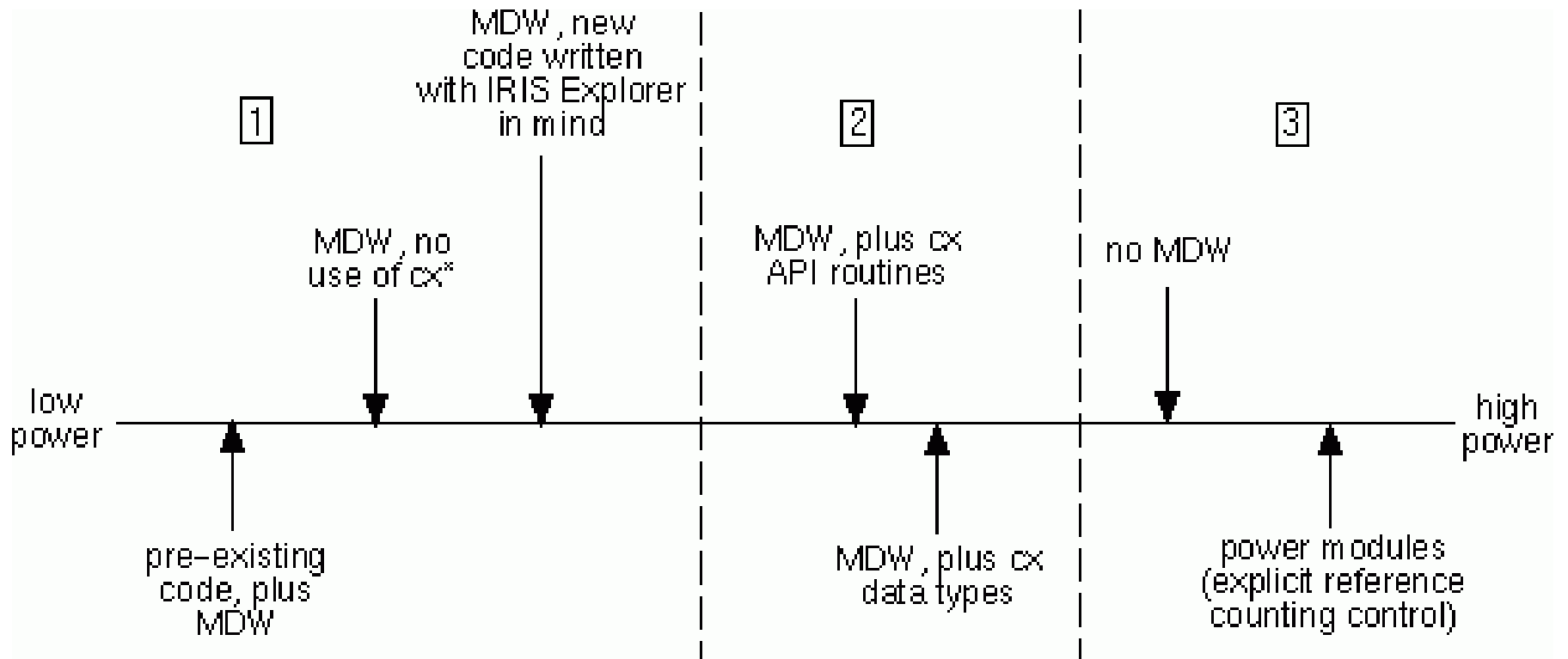
*cp /data/viz/programs/\* /usr/explorer/SAIL/templates/programs*

*ls -l /usr/explorer/SAIL/templates/programs*

# Iris Explorer Basics

- Spectrum of use
- Critical files and directories
- Documentation
- Data structures
- Shared memory & parallel processing
- Running “explorer”
- Running “mbuilder”
- Installation issues

# Spectrum of use



# Critical files & directories

## **EXPLORERHOME**

- /usr/explorer
- /usr/explorer/Explorer.config
- /usr/explorer/sample.cshrc

## **EXPLORERUSERHOME**

- ~/.explorerrc
- ~/explorer
- ~/.cshrc

# Documentation

`/usr/explorer/docs/html/index.htm`

# Data structures

- Parameter (text, integer, float)
- Lattice (n-dimensional, coordinates)
- Geometry (openInventor, OpenGL)
- Pick (interactive, point, normals, camera)

# Shared memory & parallel processing

- 32 bit addressing
- Shared memory max=512MB
- Each module has access to it
- Each module is an independent process
- Max number of modules is 64
- Each process has a 2GB memory space
- Potential memory is over 60 GB

# Iris Explorer Basics

## Running “explorer”

- Map editor
- Librarian
- NAG provided modules
- Modules (input/output, control, widgets)
- Map examples

# Iris Explorer Basics

## Running “mbuilder”

- Go to the directory with the source code
- Start mbuilder
- Define inputs/outputs
- Create source code hooks
- Create widgets
- Build & install

# SAIL Basics

- Files and directories
- Installation procedures
- SAIL manager
- Projects/templates/modules managers
- Example: LDL
- Animation suite

# SAIL Basics

## files & directories

- /usr/explorer/SAIL
- /usr/explorer/SAIL/src
- /usr/explorer/SAIL/modules\*
  
- ~/sail
- ~/sail/projects
- ~/sail/projects/0000/config
- ~/sail/projects/0000/frames
  
- ~/sail/mpeg

# SAIL Basics

## Installation procedures

- Gunzip/untar file
- Start explorer
- Start SAIL\_INSTALL
- In the SAIL source tree=> build mode
- Out of the SAIL source tree=> install mode  
you need write access to /usr/explorer

# **SAIL Basics**

## managers

- SAIL launches other modules
- Accesses explorer documentation
- Projects
- Templates
- Modules, for display management

# **SAIL Basics**

Example: LDL

- Isosurface
- Stereolimages
- BoxCrop
- LatCoord/ColorSurface
- LatCoord/LatCut

# SAIL Basics

Example: HSV\_vp5

- Pdb atoms
- Pdb backbone
- Pdb filter
- Pdb residue
- Pdb EDM
- SoTransform
- GeoBuilder

# **SAIL Basics**

## Animation

- Scripting
- Examples
- Problems/future

# SAIL Basics

## scripts

- Initial conditions
- Camera control
- Event control
- Geometry control
  
- Spreadsheet layout
- First two columns => time  
absolute + frame/fps

# SAIL Basics

scripts/initial conditions

- #SAIL\_SCRIPT version=1
- #
- IC.startTime
- IC.stopTime

# SAIL Basics

## scripts/camera control

- t f SoCamera->readFile KEYFRAME=1
- t f SoCamera.orientation.ROLL 0
- t f SoCamera.orientation.PITCH 0
- t f SoCamera.orientation.YAW 0
  
- 10 0 SoCamera.orientation.ROLL 0
- 20 0 SoCamera.orientation.ROLL 90

# SAIL Basics

## scripts/event control

- t f Event.char.ID 0 some text string
- t f Event.int.ID 0 1776
- t f Event.float.ID 0 3.1415
  
- 0 0 Event.char.ID 0 the rain in Spain
- 2 0 Event.char.ID 0 falls gently on
  
- 0 0 Event.int.ID 1 0
- 5 0 Event.int.ID 1 5
- 5 1 Event.int.ID 1 0
  
- 0 0 Event.float.ID 0 0
- 10 -1 Event.float.ID 0 3.1415

# SAIL Basics

## scripts/geometry control

- t f SoNode->readfile 0 NULL
- t f SoNode->readfile 0 ./someFile.iv
- t f SoTransform.center.file 0 ./anotherFile.iv
  
- t f SoMaterial.diffuse 0 .5 .5 .5
- t f SoMaterial.transparency 0 .25
- t f SoMaterial.specular 0 .5 .5 .5
- t f SoMaterial.shininess 0 1
  
- t f SoTransform.translation 0 0 0 0
- t f SoTransform.rot.ROLL 0 0
- t f SoTransform.rot.PITCH 0 0
- t f SoTransform.rot.YAW 0 0

# **SAIL Basics**

## Example: animations

- LDL
- HSV PDB & EM
- RDV

# SAIL Basics

## Review of SAIL modules

- Data readers
- Render
- Isosurface
- BoxCrop
- SoMaterial
- Colorsurface
- SoTransform
- LatCoord
- GenerateColormap
- ReadCLUT
- SAIL
- SAIL\_INSTALL
- Projects
- Templates
- Modules
- PDB suite
- Inventor suite
- Animation suite

# Known problems & future solutions

- Shared memory garbage collection
- Open Inventor transcribe
- Stereo graphics
- Polygons & transparencies
- Proprietary data files
- Shutdown cleanup
  
- HDF for data management
- Spaceball manager for better interface
- Integration with python

# TO GET A COPY

- IRIS explorer [www.nag.com](http://www.nag.com)
  - » Available on Linux & SGI
  - » Cost \$750-\$1000
  
- SAIL [matthewd@bcm.tmc.edu](mailto:matthewd@bcm.tmc.edu)
  - » Available on SGI
  - » Soon to available on Linux
  - » free